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GB99/4087

I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

I also certify that by virtue of an assignment registered under the Patents Act 1977, the application is now proceeding in the name as substituted.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

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Signed

Dated

13 DEC 1999



GB9826596.0

By virtue of a direction given under Section 30 of the Patents Act 1977, the application is proceeding in the name of

P.J.O.(INDITHERM) LTD,
Incorporated in the United Kingdom,
Commercial Road,
Goldthorpe Industrial Estate,
GOLDTHORPE,
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S69 9BL,
United Kingdom

[ADP No. 07666068001]

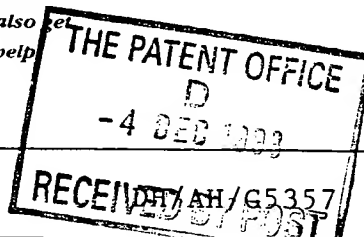
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Request for grant of a patent

(See notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

- 4 DEC 1998

04DEC98 E409413-1 000268
P01/7700 0.00 - 9826596.0
The Patent Office
Cardiff Road
Newport
Gwent NP9 1RH



1. Your reference

2. Patent application number

(The Patent Office will fill in this part)

9826596.0

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

J. O. Industrial Ltd
Commercial Road
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Patents ADP number *(if you know it)*

If the applicant is a corporate body, give the country/state of its incorporation

GR

649392001

APPLICATION FILED 31 12 98

4. Title of the invention

CONDUCTIVE MATERIALS

5. Name of your agent *(if you have one)*

HULSE & CO

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*

St James House
3th Floor
Vicar Lane
Sheffield S1 2EX

Patents ADP number *(if you know it)*

885002

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number

Country

Priority application number
(if you know it)

Date of filing
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer 'Yes' if:*

- a) any applicant named in part 3 is not an inventor, or
- b) there is an inventor who is not named as an applicant, or
- c) any named applicant is a corporate body.

YES

See note (d))

CONDUCTIVE MATERIALS

This invention relates to conductive materials and is particularly concerned with materials that need to be heated to controlled degrees, uniformly over the full area of the material.

There are many applications where a controlled uniform heat distribution is highly desirable. There are heated blankets for medical and veterinarian uses, where specific parts of a human body or of an animal can be wrapped and heated for therapeutic purposes and in emergencies. There are domestic uses such as heated bed blankets, and there are industrial uses where exposed equipment such as valves, pumps and pipes can be wrapped and heated to prevent freezing.

To maximise the heating effect and to maximise flexibility of a conductive material can be opposed and self-defeating requirements, and equally it has proved difficult hitherto to ensure a completely uniform heating effect across the whole area of the material, prior art materials exhibiting to greater or to lesser degrees a number of hot and cold spots.

The object of the present invention is to provide a flexible conductive material capable of serving those needs mentioned above.

According to the present invention, a conductive material comprises finely divided carbon particles uniformly dispersed in an elastomeric carrier. Preferably the carbon particles are so called carbon black, a finely divided powder, and the elastomeric carrier is an elastomeric polymer. According to a further feature of the invention, a semi conductive film or coating comprises a carbon filled elastomeric polymer.

The elastomeric polymer may be an aliphatic polyurethane in solution, and desirably the carbon particles are mixed without milling prior to the addition thereto of the polyurethane solution.

If required in particular applications, flame retardant materials may be provided, such as for example bromide or bromide-containing additives.

The admix of carbon particles in an elastomeric carrier may be cast as a film or transfer coated on to a suitable fabric carrier, that may have a knitted or a woven construction, whereby to induce stability to the structure without there being a serious loss of flexibility. Desirably the fabric carrier is flame proofed.

There may be provided strategically located electrical contacts for connection of the material to a source of electrical power.

Preferably a film or coating is provided in a weight between 120 and 200 grams per square metre, and further preferably 170 grams per square metre.

An essential advantage of this invention is that adequate and uniform heating can be achieved using a low voltage current, making the material suited to battery power, thus making the material totally safe to use.

Whilst a wide range of materials can be used, it has been found that a low modulus, high solids aliphatic polyester based polyurethane resin is a suitable carrier, able to take relatively high volumes of carbon black without the material stiffening or having such reduced strength as to render it unusable. Carbon black levels of 20% to 40% by weight have been found to be usable.